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ENHANCING FRESHMAN STUDENTS' WRITING SKILLS WITH A MIND-MAPPING SOFTWARE

Reima AL-JARF *

***Abstract**: Two groups of freshman students, enrolled in their first writing course in EFL, participated in the study. Before instruction, no significant differences were found between both groups in their writing ability. Both groups were exposed to the same in-class writing instruction. Since students have difficulty generating ideas in EFL, writing paragraphs with topic sentences and supporting details, a mind-mapping software was used to help students brain-storm, generate ideas, relate main ideas and supporting details. The mind-mapping software uses lines, colors, arrows, branches to show connections between the ideas generated on the mind map. Every week the software was used to create mind maps for the essays they had to write. Post-test results showed that experimental students who used the mind-mapping software, made higher gains in writing.*

***Keywords:** min mapping, concept mapping, EFL, writing, freshman students.*

I. INTRODUCTION

A mind map is a graphic organizer in which the major categories radiate from a central image and lesser categories are portrayed as branches of larger branches (Budd, 2004). It can be used to generate ideas, take notes, develop concepts and ideas, and improve memory (Buzan, 2000). It is a powerful tool that teachers can use to enhance learning and create a foundation for learning. It is helpful for visual learners as they are illustrative tools that assist with managing thought, directing learning, and making connections (Stephens & Hermus, 2007). It is a great way to introduce an overall topic, increase student involvement, and get thoughts down quickly. Mind mapping is a skill that cuts across ability levels and encompasses all subject matters (Goldberg, 2004). Using the e-map technique gives instructors the freedom to express ideas and show interrelationships between concepts and content in a very visual and nonlinear structure that benefits their students (Ruffini (2008). Mind mapping has considerable utility for tracking change in the course of learning, and has the capacity to distinguish between changes that are meaningful, and those that are not. Deep, surface and non-learning are tangible measures of learning that can be observed directly as a consequence of concept mapping (Hay, 2007).

A considerable body of research indicates the effectiveness of using mind maps in facilitating meaningful learning in science, psychology, social studies, computer science, research methods and teacher education by elementary, secondary, undergraduate and graduate students. Results of meta-analysis of 19 studies on concept mapping in science instruction indicated that concept mapping has positive effects on student achievement and attitudes (Horton and others, 1993). In a review of experimental and quasi-experimental studies in which students in grade 4 to postsecondary learned by constructing, modifying, or viewing node-link diagrams, use of concept maps to learn science, psychology, statistics and nursing was associated with increased knowledge retention (Nesbit & Adesope, 2006). In a study by Goodnough & Woods (2002) sixth-grade students who used mind mapping as an instructional and learning tool perceived MM as an entertaining and interesting

approach and thought that MM enhanced their learning. The teacher enjoyed using MM and thought that it fostered student motivation in learning science. Interviews with a random sample of kindergarten teacher educators and student teachers who used semantic webbing/mapping as a strategy for facilitating reflective and critical thinking skills, and analysis of their mind-maps revealed a change in perspectives and attitudes toward the subject matter content and teaching curriculum (Lim, Cheng, Lam & Ngan, 2003). Building concept maps as a study and homework tool in chemistry by 10th grade male and female students showed that concept mapping helped low achievers in grade 10 achieve higher in chemistry. Students exhibited positive attitudes toward using concept maps in chemistry. Female 10th graders scored higher than male students on chemistry tests, especially on questions at the knowledge and comprehension levels (BouJaoude & Attieh, 2003). Similarly, lower performing general psychology students who generated concept maps over the course material significantly performed better on their exams (Berry & Chew (2008). Collaboratively and individually-constructing computer-based concept maps had equally positive effects on 7th grade science concept learning as measured by a comprehension test (Cifuentes, 2009).

Another body of research shows that mind mapping helps students develop many skills such as dynamic thinking, critical thinking, recall and more coherent writing. For example, results of a concept map construction task showed that the cyclic structure, the quantification of the header concept, and the focus question "How" significantly increased dynamic thinking in science education (Derbentseva, Safayeni & Canas, 2007). Scholarly research by Farrand, Hussain, and Hennessy (2002) found that the mind map technique had a limited but significant impact on memory recall in undergraduate students (a 10% increase over baseline for a 600-word text only) as compared to preferred study methods (a 6% increase over baseline). Second year Digital Media students and first year students on the History of Computing module were shown how mind mapping could be used to plan the different types of work that they needed to undertake for their modules. The technique was useful in helping the students improve the structure, coherence and therefore the quality of their written work. The students continued to use mind mapping, and Mind Manager as they pursued project work in subsequent modules (Holland, Holland and Davies, 2003/2004). In English as a foreign language (EFL), EFL secondary1 and Secondary 4 students used mind mapping skills as a prewriting planning strategy. Findings revealed that the utilization of mind mapping in planning was a useful writing strategy that helped students improve their writing skills and enhance the writing quality (Chan, 2004). -

To summarize, prior studies on the use of min mapping in science, psychology, social studies, computer science, research methods and teacher education have shown positive effects on students' achievement and attitudes, knowledge, retention and recall, improved writing quality in terms of better structure and coherence of written work. Since EFL students in general and Saudi college students in particular have difficulty generating ideas in their essay writing classes, effective prewriting strategies such as brainstorming, generating, organizing and planning an essay are needed. Writing teachers should teach and train their students to make use of various planning strategies in writing. In the present study, the author trained her EFL freshman students to use a mind mapping software as a prewriting activity. The aims of the study were to investigate the impact of using a mind mapping software for brainstorming, generating and organizing ideas on students' acquisition of English writing skills. The study tried to answer the following questions: (1) Does utilization of a mind mapping software have any positive effects on EFL freshman students' writing achievement as measured by the posttest? (2) Does utilization of a mind mapping software have any positive effects on freshman students' attitudes towards writing skill development and the mind mapping activity?

To answer these questions, two groups of EFL freshman students participated in the study. One group received writing instruction that depended on the textbook only and the other received writing instruction that depended on the textbook in addition to a mind mapping software that was used for brainstorming, generating and organizing ideas in the prewriting activities. The impact of using the mind mapping software on EFL freshman students' writing skill development was based on quantitative analyses of the pre and posttests. The effect of using the mind mapping software on freshman students' attitudes was based on qualitative analyses of students' responses to a post-treatment questionnaire.

II. SUBJECTS

A total of 86 EFL female freshman students in two intact groups participated in the present study (43 students each). One group received traditional in-class instruction that depended on the textbook only (control group) and the other received a combinational of in-class traditional and mind maps using a software (experimental group). Both groups were in their first semester of the translation program at the College of Languages and Translation (COLT), King Saud University, Riyadh, Saudi Arabia. The EFL program at COLT offers four writing courses (Writing I, II, III, IV) ranging between elementary and advanced levels to students in semester 1-4. They were concurrently taking listening (3 hours per week), speaking (3 hours), reading (4 hours), writing (4 hours) and vocabulary building (3 hours) courses in English as a foreign language. The subjects were all Saudi and were all native speakers of Arabic. Their median age was 18 years, and the range was 17-19. They all had 6 years of EFL instruction in grades 6-12 prior to their admission to COLT.

III. PRETESTING

Before instruction, the experimental and control groups took the same writing pretest which required them to write a paragraph. Results of the T-test presented in Table (1) showed no significant differences between the experimental and control groups in their writing ability before the writing instruction began ($T = 1.6$; $df = 84$; $P<.08$).

IV. TRADITIONAL INSTRUCTION

The experimental and control groups were exposed to the same traditional in-class writing instruction. Both groups were taught by the author. Students in both groups studied *Interactions One: A Writing Process Skills Book* by Segal and Pavlik which was assigned by COLT. The aim of the book is to develop the students' ability to write a cohesive paragraph that has a topic sentence and supporting details with minimal grammatical, spelling, punctuation and indentation errors. The book consists of 12 chapters. Each chapter has a theme and is divided into the following parts: Exploring ideas, building vocabulary, organizing ideas, developing cohesion and style, some grammatical points, writing the first draft, editing practice, writing the second draft and journal writing. In each chapter, tasks and skills are practiced one step at a time, before the students put them all together in their paragraph.

Each chapter was completed over a week (four hours), and the book was covered over 12 weeks. Each week, students in both groups completed all of the skills, exercises and writing tasks in the chapter and wrote two one-paragraph essays. Students were always required to do all of the exercises and at least write part of their paragraph in class and rewrite their paragraphs when necessary.

Students in both groups were encouraged to write and not to worry about spelling, grammatical, punctuation or capitalization mistakes. While doing the exercises and writing the paragraphs, I monitored students' work and provided individual help. The students received communicative feedback focusing on meaning and only errors related to rules or skills under study were highlighted. Feedback was provided on the presence and location of errors but no correct forms were provided. Self-editing and peer-editing were encouraged. Extra credit was given for good paragraphs every time the students had to write a paragraph in class.

As for assessment, students in both groups were tested every other week. They were given a total of 6 quizzes. On quizzes 1, 3, and 5, the students wrote a paragraph and on quizzes 2, 4, and 6, they completed different tasks similar to those covered in class. Students were not allowed to use the dictionary during the test sessions. Quizzes were always graded, returned to the students with comments on strengths and weaknesses. Words of encouragement were always given. The slightest improvement was noted and commended. Answers were always discussed in class.

V. TREATMENT

To help the students brain-storm, generate ideas, relate main ideas and supporting details, a mind mapping software called *"Free Mind 0.8.1"* was integrated in in-class writing instruction as a prewriting activity. *Free Mind 0.8.1* was downloaded free of charge. In the first week of classes, the author trained the students to use the Free Mind Software using an LCD projector. Every week the software was used to create mind maps for the topic that the students had to write a paragraph about in class with the help of the author. They continued to use *Free Mind* at home.

A mind map begins with a word or image that symbolizes the topic the student had to write about in the middle of the screen using at least 3 colors. The subjects wrote down or drew the first things that came up to their mind when they started to think about related issues, people, places, events, reasons, characteristics or examples. They put their thoughts around the central thought. One or two word descriptions of the ideas on lines branching from the central focus were typed. Ideas expanded outward into branches and sub- branches. Ideas were expressed in words, images, codes or symbols. Images, symbols, codes and dimensions were used throughout the mind map. Keywords were selected and print using upper or lower case letters. Each word/image sat alone on its own line. The lines were connected, starting from the central image. The central lines are thicker, organic and flowing, becoming thinner as they radiate out from the centre. Colors were throughout the mind map. The students developed their own personal style of mind mapping. Associations were shown in your mind map. The mind map was kept clear by using Radiant hierarchy, numerical order or outlines to embrace your branches (See Figure 1).

When ideas slowed down, the students drew empty lines, and watched their brain automatically find ideas to put on them. The students changed colors to reenergize their mind. Sometimes they could see relationships and connections immediately and could add sub-branches to a main idea. Sometimes they could not, so they just connected the ideas to the central focus. Organization always came later; the first requirement was to get the ideas out of their head and onto the screen.

The aim of the prewriting activity was not to teach the students how to apply the details of the *Free Mind* software and how to use it in studying, reading, vocabulary building ...etc. Focus was on placing the paragraph topic in the center, how to add branches for the details, how to add pictures and change the font color, size and case.

The author served as a facilitator. She provided technical support, answered students' questions and helped with the mind maps in and out of class.

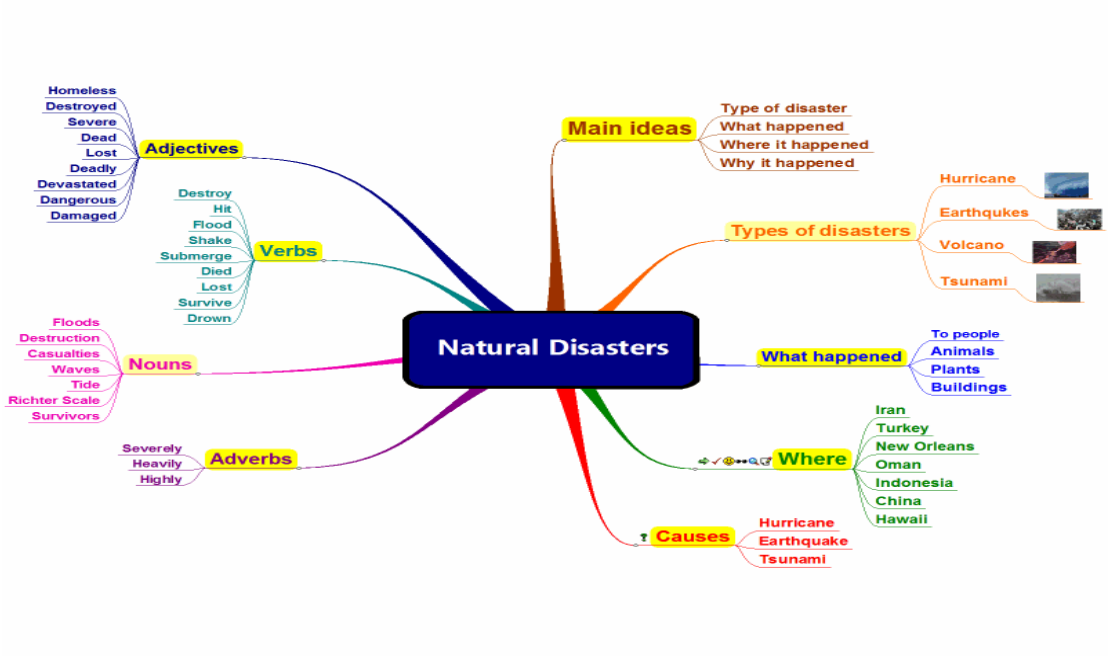

Figure 1 A student-generated mind map

VI. PROCEDURES

Before instruction, the experimental and control groups were pre-tested. They took the same writing pretest that required the students to write a paragraph. Test instructions specified the essay length and essay components related to the tasks and skills to be practiced in the book.

At the end of the experiment, the experimental group answered a post-treatment questionnaire that aimed at finding out how the students felt about their experience with the mind mapping software and whether they found it helpful. At the end of the course, all of the students answered an open-ended questionnaire, which consisted of the following questions: *(1) What did you like about the mind mapping software? What did you not like? (2) Did your writing skill improve as a result of using the mind mapping software? In what ways? (3) Did it make any difference in learning how to generate ideas and organize them? (4) What problems or difficulties did you face in using the online course? How were those problems solved? (5) How often did you use the mind mapping software? (6) How much time did you spend using the mind-mapping software? (7) Would you use it again in your future writing assignments? Why?*

In a separate session, both groups were post-tested. They took the same posttest that was part of a two-hour final exam. The final exam contained the following: (1) a letter-writing task, (2) two texts with objective questions covering all the grammar and writing tasks practiced over the semester and (3) the posttest essay that the students had never seen nor practiced in class. The essay topic was concrete and within the students' background knowledge. The test instructions specified the essay length and essay components that were taught and practiced during the course such as topic sentence, types and number of supporting ideas, use of capitalization, punctuation, spelling, conjunctions and cohesive ties…etc. The posttest instructions were as follows:

Satellite T.V. has brought many channels, movies, cultures and changes into our homes. Do you think children and teenagers should watch anything that they like on satellite T.V.? "Yes" or "No"? Write a paragraph between 10-15 lines that would explain your point of view. Give at least 3 reasons and some examples. Give your paragraph a title. Your paragraph should have a topic sentence and a conclusion. Use simple, compound and complex sentences. Pay attention to verb tenses. Add transitional words and conjunctions where necessary. Indent, insert punctuation mark, and capitalize words where necessary. When you finish, reread your paragraph and edit it. Double-check your spelling, use of punctuation marks, indentation, capitalization, conjunctions, tenses…etc.

The students were not allowed to use their dictionaries during the final exam session. The pretest and post-test essays of both groups were holistically graded based on a general impression of content, organization, cohesion, word choice, language use and mechanics. All essays were read once and a quality rating of high, above average, average, below average and low was given to each paper. Essays were then read for a second time and each was assigned a grade. I graded the essays blindly. The students wrote their ID numbers instead of their names. It was not possible to have another instructor grade the essays instead of me, as she would not know what writing skills and grammar points were emphasized and practiced throughout the course.

VII. TEST VALIDITY AND RELIABILITY

The posttest is believed to have content validity as it aimed at assessing the students' writing achievement. The tasks required in the posttest were comparable to those covered in the book and practiced in class. In addition, the test instructions were phrased clearly and the examinee's task was defined. Concurrent validity of the posttest was determined by establishing the relationship between the students' scores on the posttest and their course grade. The validity coefficient was .96. Concurrent validity was also determined by establishing the relationship between the students' scores on the posttest and their scores on the second in-term test. The validity coefficient for the writing test was .85.

Since the author was the instructor and the scorer of the pre and posttests, estimates of inter-rater reliability were necessary. A 30% random sample of the pre and posttest papers was selected and double-scored. A colleague who holds a Ph.D. degree scored the pre and posttest samples. The scoring

procedures were explained to her, and she followed the same scoring procedures and used the same answer key that the author utilized. The marks given by the rater were correlated with the author's. Inter-rater correlations was .97 for the posttest. Furthermore, examinee reliability was calculated using the Kuder-Richardson formula 21'. The examinee reliability coefficient for the posttest was .67.

VIII. DATA ANALYSIS

All pre and posttest raw scores were converted into percentages. The mean median, standard deviation, standard error and range were computed for the pretest and posttest scores of both groups. To find out whether each group made any progress as a result of the writing instruction, a within group paired T-test was computed for each group to find out whether there was a significant difference between the pretest and posttest mean scores of each group. To find out whether the students had made any progress as a result of using the mind mapping software, a within group paired T-test was computed using the pre and posttest mean scores.

IX. RESULTS

9.1 Effect of Mind Mapping on Writing Achievement

Table (1) shows that the typical EFL female freshman student scored higher on the posttest than the pretest (medians = 60% and 24% respectively) with lower variations among student scores on the pretest than the posttest (SD =3.32 and 9.39 respectively).

The pre and posttest mean scores of the control group were compared using a T-test. Results of the paired T-test revealed a significant difference between the pre and posttest mean scores at the .01 level, suggesting that student achievement in the control group significantly improved as a result of traditional in-class writing instruction (T = 15.65; df = 42).

Similarly, the pre and posttest mean scores of the experimental group were compared using a T-test. Results of the paired T-test revealed a significant difference between the pre and posttest mean scores at the .01 level, suggesting that student achievement in the experimental group significantly improved as a result of using the mind mapping software in writing instruction (T = 21.76; df = 42).

To find out which group made higher gains, an independent T-test was run using posttest mean scores. Results of the independent T-test revealed a significant difference between the experimental and control groups at the .01 level, suggesting that experimental students' made higher gains in writing achievement as a result of integrating the mind mapping software in writing instruction (T = 22.56; df = 42).

Table 1 DISTRIBUTION OF POSTTEST SCORES IN PERCENTAGES

	N	Mean	Median	Standard Deviation	Standard Error	Range
Pretest	53	20.29%	24%	2.39	. 64	5-39%
Posttest	53	64.47%	64%	8.93	1.19	25-94%

Examination of the paragraphs that students in the experimental group wrote on the posttest showed more relevant details and better organized and connected ideas than paragraphs written by the control groups. Most of the students in the experimental students drew mind maps by hand for the topic they had to write about to help them visualize and organize ideas.

9.2 Effect of Mind Mapping on Attitudes

Analysis of the student comments and responses to the post-treatment questionnaires revealed positive attitudes towards mind mapping and the writing course under study. All of the students found the mind mapping software fun and helpful in generating and organizing ideas, and considered it a new way of brainstorming and planning a paragraph. They could use the mind mapping software any

time and as many times as they needed. They could write down a central idea, focus on key ideas and think about new and related ideas which radiate out from the centre and personalize it with lines, colors, arrows, branches to show connections between the ideas generated to construct visual and meaningful relationships between ideas. They found the mind mapping software important for constructing a structured paragraph plan. They could personalize the map with their own symbols and designs to construct visual and meaningful relationships between ideas. They could revisit the mind map later on.

The subjects indicated that the Free Mind is a tool which encourages creative thinking. They could look at alternative ways of approaching a topic and it lead them to various sources of information. They also reported that they became faster in generating and organizing ideas for their paragraphs.

Although mind mapping was an unfamiliar activity, and using the Free Mind software by the subjects themselves was difficult they were beginners and unfamiliar with the English technical terms use in the software commands, they found the class illustrations easy to follow and mind mapping got easier with practice. Towards the end of the semester, mind mapping became easy to use and they used *Free Mind* between 1-4 times a week and took them between 30-60 minutes to generate a mind map for a paragraph, depending on the students' English proficiency level and level of expertise in using the computer. The subjects also indicated that they will continue to use the mind mapping software in the subsequent writing courses in the upcoming levels.

X. DISCUSSION AND CONCLUSION

Significant difference in writing achievement were found between Saudi EFL freshman students at the COLT who received tradition writing instruction that depended on the textbook only and those who were trained to use a mind mapping software to brainstorm, generate and organize ideas as measured by the posttest. This means that use of the mind mapping software proved to be a powerful tool for improving students' ability to generate, visualize and organize ideas. It made the topic more tangible. Mind mapping raised the good and average student performance and the performance of the lowest-performing students as well. Users of the mind mapping software became faster and more efficient in generating and organizing ideas for their paragraphs and were able to generate more detailed ideas than students who did not use the mind mapping software. Moreover, the present study revealed positive effects of mind mapping on students' attitudes towards the mind mapping prewriting activity.

Findings of the present study are consistent with findings of other research conducted on the use of mind maps in which students in different grade and college levels and different subject areas by Horton and others (1993), Nesbit & Adesope (2006); Goodnough & Woods (2002); Lim, Cheng, Lam & Ngan (2003); BouJaoude & Attieh (2003); Berry & Chew (2008); Cifuentes, (2009); Holland, Holland and Davies (2003/2004); and Chan (2004).

The subjects' initial unfamiliarity with the mind mapping technique and mind-mapping software is partially consistent with findings of a study by Farrand, Hussain, and Hennessy (2002) who found a limited but significant impact of the mind map technique on memory recall in undergraduate students (a 10% increase over baseline for a 600-word text only) as compared to preferred study methods (a 6% increase over baseline). Unlike the present study, improvement in Farrand, Hussain, and Hennessy's study was only robust after a week for those in the mind map group, and there was a significant decrease in motivation compared to the subjects' preferred methods of note taking. Farrand, Hussain, and Hennessy found that learners preferred to use other methods because using a mind map was an unfamiliar technique, and its status as a "memory enhancing" technique engendered reluctance to apply it, whereas in the present study, mind mapping was not used for enhancing.

Since the mind mapping software was used with freshman students enrolled in their first writing course in college, who were practicing writing at the paragraph level only, use of Free Mind was not used to generate complex ideas at a multi-paragraph essay. Therefore, the present study recommends that a follow up study be conducted in the subsequent writing courses to see whether the

subjects are continuing to use the mind mapping techniques in generating and organizing ideas. Use of the mind mapping software should be also extended to other advanced level writing courses and other language courses at COLT such as reading, vocabulary building and grammar. When using the mind mapping software, it is recommended that students use it to construct mind maps collaboratively. Kwon & Cifuentes (2009) found that students who collaboratively constructed concept maps created significantly higher quality concept maps than those who individually constructed concept maps indicating deeper conceptual understanding. For Effective use of the mind mapping software, it is recommended that language instructors at COLT need to be trained in using Free Map as well.

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